

Andres Aviles

NASA MUST-HCF

Technical Paper

August 2, 2007

My Rewarding Summer Research Experience at NASA

My summer research experience at the Kennedy Space Center has been a truly rewarding one. As an electrical engineering student at the University of South Florida, I was blessed with a beneficial opportunity to gain valuable knowledge in my career, and also apply it through working at NASA. One of my inspirations in becoming an engineer is to work at NASA someday, and I was very excited and honored to have this opportunity. My goal in this internship was to strengthen my preparation in becoming an engineer by learning new material, acquiring skills by practicing what I learned, and discovering the expectations of engineering work at NASA.

Through this summer research, I was able to learn new computer programs and perform various tasks that gave me experience and skills as an engineer. My primary job was to conduct work on the Constellation Test article, which is a simulation model of the Crew Launch Vehicle (CLV) tanking system. This is a prototype of a launch facility and an Ares I Vehicle, which God willing will transport astronauts to the moon. Construction of the CLV is in progress and a test launch is anticipated for 2010. Moreover, the Test Article serves as a demonstration too, training test bed, and may be expanded for new simulation of launch system elements, which could be applied to real life operations. The

test article is operated and run by a Programmable Logic Controller (PLC), which is a digital computer that is used to control all forms of machinery such as those in manufacturing buildings and other industries. PLCs are different than other computers because of the physical protection they have against damaging environmental conditions that would destroy other computers. Also, PLCs are equipped with lots of input and output connections that allow extensive amounts of commands to be executed, which would normally require many computers to do. Therefore, PLCs are small, rugged, and extremely powerful tools that may continue to be employed at NASA. Furthermore, in order to conduct productive work on the Test Article, I needed to learn the computer program called RS Logics 5000. This program allows a user to actually program the PLC itself in order to carry out certain functions in specific amounts of time. RS Logics is a fairly simple program to learn because it lays out a drawing of the paths containing the functions to be performed and allows a user to easily manipulate them, offering help tutorials for assistance. Thus, learning RS Logics and the functions of a PLC allowed me to assist my mentor in making some improvements to the Test Article. A successful improvement made consisted of re-programming the PLC by changing the weight sensor variations in order to prevent an occurring overflow of the chemical tanks in the vehicle. This task certainly gave me some experience in applying the knowledge I was gaining. In addition, the usage of the PLC is growing, and I was privileged to learn and apply its functions, better preparing myself in becoming a great engineer at NASA. Moreover, I also had the privilege of learning a computer program called AutoCAD Electrical. One of my tasks was to develop a schematic drawing of the wiring on the PLC, which was connected to the Test Article. This drawing needed to be completed on AutoCAD

electrical, which serves as a drawing tool for purposes such as constructing architectural layouts, building diagrams, and many other drawings. After studying a book on AutoCAD, I was able to learn it and successfully draw a complete wiring diagram of the PLC. Indeed, AutoCAD is a program used in many forms of engineering, and the opportunity I had in learning and applying it has surely better prepared me as an engineer. Furthermore, for my final task, I set forth to learn another computer program called RSView. This program allows the user to easily and fashionably control individual components of the Test Article at any moment in time, regardless of the functions programmed in RS Logics 5000. The Test Article already operated on a similar program called GEiFiX, but due to business purposes, that program needed to be replaced with RSView. Therefore, my task was to do so by setting up a similar interface with RSView. In this case, the interface referred to the point of interaction between myself (the user), and the PLC. With my mentor's help, and through testing and reading, I successfully created a new control interface through RSView. Moreover, RSView may certainly be a useful tool for engineers to apply in managing various machines and other devices, Therefore, learning this program also gave me valuable knowledge that may help me in my engineering career.

The experience I had in being in the working environment at NASA allowed me to observe and become familiar with the nature and conditions of work as an engineer. I was able to observe my mentor, Jeff Vickers, and other engineers work on a personal level, and gain more understanding of what to anticipate by working as an engineer and what others may expect from me. I realized that being an engineer is challenging at times, but also very rewarding if one puts forth the creativeness, hard work, and determination

required to effectively accomplish an assigned task. For instance, there were times when I found it challenging to understand a program that I was learning, but once I applied myself and studied with persistence, I learned the material and was able to successfully complete my job. Moreover, I also noticed that other fellow co-workers would help one another in teams and provide helpful advice and inputs in order to produce the best results in a project. For example, weekly meetings were held where engineers could share their progress and ideas with one another. The atmosphere was never uncomfortable because most employees were friendly and amicable, and a cool air temperature was kept throughout the building at all times. Also, the engineers never seemed to be pressured and a fair amount of time was given in order to complete an assigned project, which allowed them to work at a steady pace. Therefore, if an engineer is determined, applies himself, and is willing to share his ideas and assist others, he will most likely have a successful career at NASA and perhaps at any other institution.

Furthermore, with all this mentioned, it becomes obvious that my summer research experience at NASA has been a truly rewarding one. Not only did I learn lots of valuable information, but I was also able to apply it and gain skills through experience in a hands-on working environment. Also, being in this environment at NASA has given me the experience that allowed me to become aware of the expectations of working as an engineer. I feel more confident now in pursuing my electrical engineering degree because of the knowledge and skills I acquired. With God's help, I will continue learning through hard work in order to be the best engineer that I can be.

CONSTELLATION TEST ARTICLE

